**CRUISE INSTRUCTIONS: NOAA SHIP NANCY FOSTER**

Cruise Title: **Calibration of seagrass injury and disturbance recovery models and fishery habitat utilization in southeastern Puerto Rico and Vieques Island**

Cruise Number: NF-06-04-SEA

Period of Cruise: DEP: 4/05/06 San Juan, PR and Transit to Southeastern PR and Vieques
DEP: Southeastern PR and Vieques 4/15/06 and Transit to San Juan

Area of Operation: Southeastern Puerto Rico in Naval Station Roosevelt Roads (NSRR) at approximately 18°13.5657'N, 65°37.6615'W, northwest coast of Vieques Island at approximately 18°08.2350'N, 65°32.7160', South coast Vieques at 18°06.2104"N, 65°22.0513"W

## 1.0 Scientific Objectives:

Primary:

A) Sample seagrass injury and disturbance sites established at NSRR, northwest and south coasts of Vieques to determine habitat recovery rates for calibration of a seagrass injury and disturbance recovery model.

B) Quantitatively sample fish communities associated with bank-shelf and mangrove habitats at NSRR (Bahia Algodones and Bahia Puerca) and Vieques Island (Puerto Ferro and Ensenada Honda) to determine resource value as nursery and adult fishery habitats.

C) Conduct benthic habitat surveys of Puerto Ferro and Puerto Mosquito on south Coast of Vieques confirm existing habitat maps and resource values.

C) Collect Ciguatoxic Fishes (Barracudas) for developing a Ciguatera toxin standard.

## 2.0 Schedule of Operations:

### 2.1 Daily Schedule:

The daily schedule will generally involve deployment of three field teams each in separate launches, one team (**seagrass**) will be working on seagrass sampling (plant marking, visual assessments and sediment coring) and bathymetry measurements, and two teams (**fish**) will be conducting visual fish/habitat surveys and diver operated push net sampling. We will also have a sample processing team on board the ship which will be processing seagrass and push net samples (**processing)** and also collecting ciguateric fishes (e.g., barracuda). The Fish teams will either be working in close proximity to each other on the same on the same transect or leap-

frogging with one team advancing to the next station on a transect to set up the next sampling site and initiate sampling. There will be three of these transects, one at NSRR, and two on the south shore of Vieques (Figures 1 and 2). There will also be point sample stations on NSRR and Vieques separate from the three transects. The fish team and processing team will also be responsible for collecting ciguatoxic fish species (preferably barracuda). All of these sample sites will are expected to be in <25m of water.

The seagrass team will be working quasi-independently of the fish team and may include two sub-teams, one doing visual assessments and bathymetry, and another team doing the sediment coring. The fish team will be sampling along established transects running from the mangrove fringe shoreline to the bank shelf off shore of the mangroves and out to the reef/seagrass meadow at the edge of the bank shelf.

At all times there will be a sample processing team on board the ship working on samples, compiling data and attempting to capture ciguatoxic fish species (preferably barracuda).

**03-04 April (Monday-Tuesday):**

*All*: Science party boards vessel in San Juan to begin gear preparation.

**05 April (Wednesday):**

*All* (0800-1200): Ship steams to NSRR Science party installs gear, conducts gear shake down, organize dive plans, and mission briefing with science party and ship's crew. Organize science party into field teams.

*SEAGRASS TEAM* (1300 – 1700): Deploy two small launches (RHIBS) and seagrass sampling teams will transit to blowout sites on Northwest Coast of Vieques to set up leaf growth stations (≅18°13.9690'N, 65°37.5473'W).

*FISH SURVEY TEAM* (1300-1700): Deploy Sea Ark and fish survey team will transit to shallow seagrass sites on northwest coast of Vieques (≅18°12.2654'N, 65°39.3729'W)

*PROCESSING TEAM* (1300-1700): Sample processing team will set up laboratory and processing stations on Nancy Foster.

Upon completion of sampling Nancy Foster will steam into Ensenada Honda and set anchor (≅18°13.3509'N, 65°37.5710'W). Foster will remain at this anchorage in Ensenada Honda until NSRR sampling if complete. This should take 3-4 days depending on weather and interruptions in sampling operations.

**06 April (Thursday):**

*SEAGRASS TEAM* (0800-1100): Deploy launch (Sea Ark), transit to western Bahia Algondones to sample seagrass disturbance sites (≅18°13.3509'N, 65°37.5710'W). Sampling will include SCUBA divers and snorkeling teams conducting sediment coring and Braun-Blanquet visual assessments of benthic habitat. The team will return to ship for lunch with samples for processing team. The Sea Arc will also carry extra SCUBA bottles for fish team to be delivered on trip back to ship.

*FISH TEAM:* (0800-1700) Deploy two small launches (RHIBS) and transit to Bahia Algondones east transect and begin sampling at deepest offshore stations (≅18°10.2672'N, 65°39.7687'W) and working inshore (≅18°12.2654'N, 65°39.3729'W). Team will continue working transect from onshore to offshore until transect is completed. We are requesting to bring lunch on the two launches. Team returns to Nancy Foster at 1700.

*SEAGRASS TEAM* (1200-1700): When Bahia Algondones west is completed the team will move to Bahia Algodones east to continue sampling (≅18°12.2654'N, 65°39.3729'W).

*PROCESSING TEAM* (0800-1700): Processing team will remain onboard working on samples.

**07 April (Friday):**

*SEAGRASS TEAM* (0800-1700): Deploy launch (Sea Ark), transit eastern Bahia Algodones to continue seagrass sampling from previous day or move to Pelican Cove (≅18°12.2654'N, 65°39.3729'W) to begin sampling there. Return to Nancy Foster at lunch with samples for processing team. After lunch return to either Bahia Algodones or Pelican Cove to continue sampling. Sea Arc will carry extra SCUBA tanks for fish team.

*FISH TEAM:* (0800-1700) Deploy two small launches (RHIBS) and transit to Bahia Algondones east and continue transect initiated on 06 April beginning with deepest offshore stations (≅18°10.2672'N, 65°39.7687'W) and working inshore (≅18°12.2654'N, 65°39.3729'W). Team will continue working transect from onshore to offshore until transect is completed. We are requesting to bring lunch with us on the launches. Spare scuba tanks will be carried by Sea Arc Team for re-supplying fish team. Fish team will bring lunch and return to Nancy Foster at 1700.

*PROCESSING TEAM* (0800-1700): Continue Processing samples on Nancy Foster.

**08 April (Saturday):**

*SEAGRASS TEAM* (1200-1700): Deploy Sea Ark and transit to Pelican Cove to finish sampling (≅18°12.2654'N, 65°39.3729'W) return to ship at lunch with samples. After lunch either return to Pelican Cove to complete sampling.

*FISH TEAM:* (0800-1700) Deploy small launches (RHIBS) finish transect in Bahia Algodones or transit to Bahia de Puerca to begin sampling (≅18°13.4873'N, 65°37.3717'W). Return to

ship
at lunch. After lunch either begin or continue to sample at Bahia Puerca.

*PROCESSING TEAM* (0800-1700): Continue Processing samples on Nancy Foster.

**09 April (Sunday):**

*SEAGRASS TEAM* (0800-1100): Deploy Sea Ark and transit to sample disturbance site on northeast corner of NSRR at Puerto Medio Mundo and initiate sampling (≅18°15.4388'N, 65°37.3717'W). Seagrass team will bring lunch on launch and return at 1700.

*FISH TEAM:* (0800-1700) Deploy small launches (RHIB), transit to Bahia de Puerca to finish sampling (≅18°13.4873'N, 65°37.3717'W). Return to ship at lunch. If needed, after lunch finish sampling at Bahia Puerca.

*PROCESSING TEAM* (0800-1700): Continue Processing samples on Nancy Foster.

*NANCY FOSTER*: (1800) Move Nancy Foster to west coast of Vieques to same anchorage as used last February at ≅18°06.3359'N, 65°35.4049'W.

**10 April (Monday):**

*NANCY FOSTER*: (0600) Move Nancy Foster to south Coast of Vieques near Ensenada Honda to deploy launches for fish team (≅18°06.0849'N, 65°21.9191'W).

*FISH TEAM*: (0800-1700): Deploy launches (Sea Arc and RHIB) and begin sampling Ensenada Honda transect working from offshore deep sites (≅18°06.2104'N, 65°22.0103'W) to inshore shallow sites (≅18°07.5903'N, 65°21.8310'W). Fish team will bring lunch and return to Nancy Foster at 1700.

*NANCY FOSTER*: (0830) After deploying fish team Nancy Foster will move back west to just offshore of Puerto Ferro (≅18°05.2898'N, 65°26.4144'W) to deploy small launch with seagrass team. Seagrass team will proceed into Puerto Ferro to begin sampling.

*SEAGRASS TEAM:* (0830-1200): Deploy RHIB (≅18°05.2898'N, 65°26.4144'W) and transit into Puerto Ferro for sampling (≅18°06.1686'N, 65°26.8110'W). Return to Foster for lunch.

*NANCY FOSTER*: (0830-1200): Will stand off steaming between Fish Team and Seagrass team while member of processing team troll to catch barracuda for ciguatoxin study.

*SEAGRASS TEAM:* (0100-1700): Transit into Puerto Ferro to continue sampling.

*PROCESSING TEAM* (0800-1700): Continue Processing samples on Nancy Foster.

*NANCY FOSTER*: (1200-1700): Will stand off steaming between Fish Team and Seagrass team while member of processing team troll to catch barracuda for ciguatoxin study.

*NANCY FOSTER*: (1800): After supper and recovery of launches the Foster will steam back to the anchorage on west end of Vieques for the night (≅18°06.3359'N, 65°35.4049'W).

**11 April (Tuesday)**

*NANCY FOSTER*: (0600) Move Nancy Foster to south coast of Vieques near Ensenada Honda to deploy launches for fish team (≅18°06.0849'N, 65°21.9191'W).

*FISH TEAM*: (0800-1700): Deploy launches (Sea Arc and RHIB) and continue sampling Ensenada Honda transect working from offshore deep sites (≅18°06.2104'N, 65°22.0103'W) to inshore shallow sites (≅18°07.5903'N, 65°21.8310'W). Fish team will bring lunch and return to Nancy Foster at 1700. Depending on outcome of previous day, arrangement of small launches between teams may change.

*NANCY FOSTER*: (0830) After deploying fish team Nancy Foster will move back west to just offshore of Puerto Ferro (≅18°05.2898'N, 65°26.4144'W) to deploy small launch with seagrass team.

*SEAGRASS TEAM:* (0830-1700): Deploy RHIB (≅18°05.2898'N, 65°26.4144'W) and transit into Puerto Ferro for sampling (≅18°06.1686'N, 65°26.8110'W). Launch will bring lunch and not return until 1700.

*NANCY FOSTER*: (0830-1700): Will stand off steaming between fish team and seagrass team while members of processing team troll to catch barracuda for ciguatoxin study.

*PROCESSING TEAM* (0800-1700): Continue Processing samples on Nancy Foster.

*NANCY FOSTER*: (1800): After supper and recovery of launches, steam back to the anchorage on west end of Vieques for the night (≅18°06.3359'N, 65°35.4049'W).

**12 April (Wednesday)**

*NANCY FOSTER*: (0600) Move Nancy Foster to south Coast of Vieques near Ensenada Honda to deploy launches for fish team (≅18°06.0849'N, 65°21.9191'W).

*FISH TEAM*: (0800-1700): Deploy launches (Sea arch and RHIB) and continue sampling Ensenada Honda transect working from offshore deep sites (≅18°06.2104'N, 65°22.0103'W) to inshore shallow sites (≅18°07.5903'N, 65°21.8310'W). Fish team will bring lunch and return to Nancy Foster at 1700. Depending on outcome of previous day, arrangement of small launches between teams may change.

*NANCY FOSTER*: (0830) After deploying fish team Nancy Foster will move back west to just offshore of Puerto Ferro (≅18°05.2898'N, 65°26.4144'W) to deploy small launch with seagrass team.

*SEAGRASS TEAM:* (0830-1700): Deploy RHIB (≅18°05.2898'N, 65°26.4144'W) and transit into Puerto Ferro for sampling (≅18°06.1686'N, 65°26.8110'W). Launch will bring lunch and not return until 1700.

*NANCY FOSTER*: (0830-1700): Will stand off steaming between fish Team and eagrass team while member of processing team troll to catch barracuda for ciguatoxin study.

*PROCESSING TEAM* (0800-1700): Continue Processing samples on Nancy Foster.

*NANCY FOSTER*: (1800): After supper and recovery launches, steam back to the anchorage on west end of Vieques for the night (≅18°06.3359'N, 65°35.4049'W).

**13 April (Thursday)**

*NANCY FOSTER*: (0600): Move Nancy Foster to south coast of Vieques just offshore of Puerto Ferro (≅18°05.2898'N, 65°26.4144'W) to deploy all launches with fish and seagrass teams.

*FISH TEAM*: (0800-1700): Deploy launches (Sea ARK and RHIB) and fish team will begin sampling Puerto Ferro transect working from offshore deep sites (≅18°05.2898'N, 65°26.4144'W) to inshore shallow sites (≅18°06.1686'N, 65°26.8110'W). Fish team will bring lunch and return to Nancy Foster at 1700. Depending on outcome of previous day, arrangement of small launches between teams may change.

*SEAGRASS TEAM:* (0800-1200): Deploy RHIB (≅18°05.2898'N, 65°26.4144'W) and transit into Puerto Mosquito for sampling (≅18°06.4615'N, 65°25.7533'W). Seagrass team will return to ship with samples at lunch.

*NANCY FOSTER*: (0830-1200) After deploying fish team Nancy Foster will stand off of Puerto Ferro

*NANCY FOSTER*: (0830-1700): Will stand off steaming trolling while members of processing team try to catch barracuda for ciguatoxin study.

*SEAGRASS TEAM:* (1200-1700): Return to Puerto Mosquito to continue sampling (≅18°06.4615'N, 65°25.7533'W).

*PROCESSING TEAM* (0800-1700): Continue Processing samples on Nancy Foster.

*NANCY FOSTER*: (1800): After supper and recovery launches, steam back to the anchorage on west end of Vieques for the night (≅18°06.3359'N, 65°35.4049'W).

**14 April (Friday)**

*NANCY FOSTER*: (0600): Move Nancy Foster to south Coast of Vieques just offshore of Puerto Ferro (≅18°05.2898'N, 65°26.4144'W) to deploy all launches with fish and seagrass teams.

*FISH TEAM*: (0800-1700): Deploy launches (Sea ARK and RHIB). Fish team will continue sampling Puerto Ferro transect working from offshore deep sites (≅18°05.2898'N, 65°26.4144'W) to inshore shallow sites (≅18°06.1686'N, 65°26.8110'W). Fish team will bring lunch and return to Nancy Foster at 1700.

*SEAGRASS TEAM:* (0800-1200): Deploy RHIB(≅18°05.2898'N, 65°26.4144'W) and transit into Puerto Mosquito for sampling (≅18°06.4615'N, 65°25.7533'W). Seagrass team will return to ship with samples at lunch.

*NANCY FOSTER*: (0830-1200): After deploying fish team Nancy Foster will stand off of Puerto Ferro

*NANCY FOSTER*: (0830-1700): Will stand off steaming trolling while members of processing team try to catch barracuda for ciguatoxin study.

*SEAGRASS TEAM:* (1200-1700): Return to Puerto Mosquito to continue sampling (≅18°06.4615'N, 65°25.7533'W).

*PROCESSING TEAM* (0800-1700): Continue Processing samples on Nancy Foster.

*NANCY FOSTER*: (1800): After supper and recovery launches, steam back to the anchorage on west end of Vieques for the night (≅18°06.3359'N, 65°35.4049'W).

**15 April (Saturday)**

*SEAGRASS TEAM:* (0800-1200): Deploy RHIBS at anchorage on west coast of Vieques (≅18°06.3359'N, 65°35.4049'W) and transit to northwest coast of Vieques to recover marked seagrass plants (≅18°13.9690'N, 65°37.5473'W).

*FISH TEAM*: (0800-1700): Deploy Sea ARK with fish team will transit to patch reefs on northwest coast of Vieques and begin sampling

*NANCY FOSTER*: (0800-1200): Will stand off at anchorage until seagrass team and fish

team return.

*PROCESSING TEAM* (0800-1700): Continue Processing samples on Nancy Foster and begin to pack gear.

*NANCY FOSTER*: (1200-1700): Steam back to San Juan.

**2.2 Watches:**
Vessel operations will typically be a ~ 18 hour workday. A "give and take" operation cycle will be instituted during these workdays via consultation between the Chief Scientist and Commanding Officer in order to balance crew complement with demands of day-night operations.

In Science Party, the Field Party Chief is responsible for organization of operations and data, respectively; Chief Diver is responsible for dive record keeping and developing dive profiles for presentation to the Chief Scientist who will clear them with the Commanding Officer or a designee.

**3.0 Site Locations:**
(See Figures at end of text)

**3.1 Map of Operations:**
(See Figure at end of text)

**4.0 Description of Operations:**

Science staff is organized into three teams with defined responsibilities. Several are either NOAA Divermasters, Working Divers, or Science Divers (see Section 6.3). There are also numerous skilled small boat operators, some with life-long experience in the operation of vessels less than 15m, certified in CPR and First Aid and available to operate small craft should the Ship desire this assistance. We request use of hand-held radios for communication among the deck, science lab, sea lab, small boats and ship operations.

*Dive operations and Benthic Sampling:*

All divers will be certified at least at the NOAA Scientific Diver level or will have presented their current dive physical information, dive certification card, and letters of reciprocity to the Chief Diver. Most dives will be conducted on air in shallow water generally <60', but depending on depth we may also use 32% NITROX. Bottom times to be determined according to water depths, dive tables and Divemaster approval. The Sea Ark, RHIBs and potentially the RV Foster will be utilized to transport divers to specific dive locations. The latitude and longitude of all dive sites will be selected ahead of time and stored in either separate Garmin GPS or Trimble DGPS units (one per launch). Each boat will navigate to the dive site using the GPS or DGPS provided by scientific party.

For the seagrass team working in Ensenada Honda, Bahia Algondones, Playa Naguabo, Puerto Ferro, Puerto Mosquito and the northwest coast of Vieques all dive sites are less than 30 ft deep and pre-determined during a prior study. The seafloor consists of a relatively continuous cover of seagrasses intermixed with macroalgae, coral and other invertebrate species. The deepest dive sites with be conducted by the fish team on the deepest stations of each of the three transects at Bahia Algodones, Ensenada Honda on Vieques and Puerto Ferro on Vieques, approximately 60-70 ft.

Among the seagrass meadows are a series of physical disturbances where either a vessel grounded or manatees excavated seagrasses during feeding. The protocol for sampling each site includes the following; 1) a DGPS map of the perimeter, 2) qualitative visual examination and video transects, 3) quantitative visual census of seagrass, coral and macroalgal cover and species composition, and 4) quantitative measurement of seagrass shoot density and biomass by extracting sediment cores. We will also be conducting bathymetry surveys at each site.

Upon locating a sampling site using DGPS one dive team will recon by snorkel to verify site conditions. Next, a second dive team will lay out either metric calibrated measuring tapes or buoys to make the perimeter of the sites. One dive team will conduct benthic sampling inside the injury and the second dive team will conduct benthic sampling in the uninjured seagrass meadow adjacent to the disturbance site. Each diver will be equipped with a $0.25m^2$ collapsible PVC Braun-Blanquet quadrat, one $0.04m^2$ PVC quadrat for shoot counts, and one clipboard with data sheets and a dive team will also have a corer. Each team will navigate to the pre-determined random points where a visual census will be conducted. Once the benthic sampling is completed the divers will return to the launch and map the perimeter of the disturbance using DGPS. A separate team of snorkelers and divers will be taking 15 cm diameter cores, placing the cores in mesh bags and returning them to the launch.

On the south coast of Vieques we will be conducting a habitat characterization study and bathymetry and assessing the condition of two lagoons, Puerto Ferro and Puerto mosquito as part of a joint collaboration with NOAA's Office of Response and Restoration in conjunction with the Vieques Restoration Project.

We will also be conducting a leaf marking study at the previously studied seagrass blowouts on the northwest coast of Vieques. Individual seagrass shoots will be marked within defined quadrats located and labeled underwater by SCUBA divers. The plants will be marked on the first day and recovered on the final day. This operation requires two vessels and a minimum of four divers. All stations will be located and recovered using DGPS.

The purpose of fish investigations will be to determine the distribution of fishes among benthic habitat types along three onshore to offshore transects to include the mangrove shoreline, adjacent seagrass/coral habitat, shelf habitat and shelf edge habitat. Four benthic habitat types are of primary interest: mangrove prop root fringe, reef, vegetated bottom, and unconsolidated sediments. Fish investigation field parties will consist of two to four dive teams. The vessel will

navigate to locations picked from study area habitat maps via DGPS. Data collection will consist of point and band transect visual census and Braun Blanquet habitat assessment by SCUBA divers. A diver operated push net may be deployed in vegetated and unconsolidated sediments to collect voucher specimens of resident juvenile fishes,

**SPECIAL CONSIDERATIONS**:

1) Use of the Sea Ark and both RHIBs are requested.
2) Support for dive operations is requested. Specifically, a boat driver for the SeaArk and each RHIB that is launched. We have experienced boat operators and dive masters in science party to relieve ship personnel if necessary.
3) Support for the ships air and NITROX systems.
4) Support for the ships deck equipment.

## 5.0 Requirements and Equipment:

### 5.1 Vessel Provided:

1. Rigid vessels (i.e. Inflatable/RHIBs) and Sea Ark for dive, survey, and equipment. deployment operations - access to 12V battery of launch for powering small inverter.
2. Divers to assist in dive operations (optional).
3. Laboratory space for survey equipment.
4. Air compressor and NITROX system for SCUBA tank and bank filling; training in use of same.
5. Emergency oxygen for dive operations with sufficient capacity for 3 h breathing for two divers.
6. Diver recall system.
7. Hand held radios for communication between deck, Sea Lab, launches, etc.

### 5.2 Program Provided:

1. Dive equipment for SCUBA divers
2. 2. ~5 laptop computers.
3. Misc. benthic sampling equipment.
4. Permits for conducting otherwise prohibited activities in Puerto Rico
5. Sample processing supplies.
6. Cell phones..
7. Extra emergency oxygen kits.
8. Underwater Video Cameras
9. Spill response kit.

## 6.0 Scientific Personnel:

### 6.1 Chief Scientist Authority:

The Chief Scientist has the authority to revise or alter the technical portions of the instructions provided that, after consultation with the Commanding Officer, it is ascertained that the proposed changes will not: 1) jeopardize the safety of the personnel on the ship, 2) exceed the time allotted for the project, 3) result in undue additional expense, or 4) alter the general intent of the Project Instruction.

**6.2 Chief Scientist:**

Dr. W. Judson Kenworthy, CCFHR, NOS/NCCOS (252) 728-8750 work / (252) 241.3474 cell / (252) 728 2157 home

Jud.Kenworthy@noaa.gov

**6.3 Scientific Personnel List**:

| ***Male***: | diver |
|---|---|
| Kenworthy | d |
| Burke | d |
| Meehan | d |
| Merello | d |
| Degan | d |
| Hackney | d |
| Kirsch | d |
| Di Carlo | d |
| Madley | d |
| Judge | d |

| ***Female***: | |
|---|---|
| Uhrin | d |
| Poray | d |
| Kunzelman | tbd |
| Sullivan | no |

| | |
|---|---|
| Nilda Jimenez | *tbd* |
| GRAND TOTAL | 15 |

**TASK TEAMS**

Personnel configuration of Task Teams will be determined daily by the Chief Scientist.

Identification: All scientific personnel planning to board the ship should have in their possession at the time of boarding, a proper photo identification card (agency ID, driver's license, etc.).

Up to date NOAA or AAUS dive and NITROX certifications will be cleared through the NOAA Dive Office before arrival aboard NANCY FOSTER. All dive personnel should have in their possession at the time of boarding, a copy of their NOAA certified dive physical (water proof paper preferred).

**6.4 History Reports**:
Upon acceptance of this proposal, and receipt by the Chief Scientist of the forms, the Chief Scientist will forward completed copies of the NOAA Health Services Questionnaire for all embarking scientific personnel to the Commanding Officer for review at lease 7 days in advance of the cruise.

**7.0 Miscellaneous Activities:**
None known at this time - however, the highly exploratory nature of the Northwest Vieques coastline sampling will likely spawn some kind of rapid-reaction sampling.

**7.1 Bridge Activities:**
It is requested that a copy of the ship's *Deck Log - Weather Observation Sheet NOAA 77-13d* for and digital SCS data for the entire cruise be provided to the Chief Scientist upon departure of the science party or transmitted within 2 weeks thereafter.

**8.0 Modification of Cruise Instructions:**
Additional operations and ancillary projects, not covered under the main project, may be performed on a "not to interfere" basis. The Chief Scientist is responsible for determining the priority of the additional work, provided that any changes are discussed with the Commanding Officer and do not constitute a risk to the safety of the ship or personnel and do not significantly change the schedule for this cruise. If the requirements for the additional work place significantly different requirements on the ship, amendments to the Cruise Instructions must be prepared and approved.

**9.0 Ancillary Tasks:**
Ship's personnel conduct ancillary tasks. Instructions for ancillary tasks routinely assigned to Marine Operations Center ships are contained in *Marine Operations Center Directive 1803.00, Ancillary Tasks for NOAA Vessels*.

**10.0 Hazardous Materials**:
An inventory list and a *Material Safety Data Sheet* for each hazardous material will accompany hazardous material brought on board NOAA Ship NANCY FOSTER by scientific parties. This information should be provided to the Commanding Officer. On departure from the ship, scientific parties will provide an inventory of hazardous material to the Commanding Officer showing that all hazardous material brought on board have been properly used up or removed in

suitable waste containers. Anticipated hazardous materials (due to their flammable nature) include:

1) ~ 200L [50 gal] Ethyl Alcohol
2) ~ 10 L [3.25 gal] Formalin
3) emergency oxygen (portable kit with 2 bottles)
4) three, 2.5-Oz. Butane refill canisters for cable repair, kept in toolbox.

The *Material Safety Data Sheet* is normally available from the manufacturer of the hazardous product. Procedures followed for use of chemicals will be those outlined in the *Chemical Hygiene Plan for Chemical Labs* aboard NOAA ships. The Science Party will provide a small spill containment kit appropriate for these chemicals.

**11.0 Navigation:**
Navigation for sampling surveys and dive station location will often be by Differential GPS. Science Lab will use independent DGPS that is compatible with program software - communication on navigation will be maintained. Small boat ops will be directed both by NANCY FOSTER and program DGPS. Station operations will be recorded in DGPS. For the rest of the cruise, navigation will be by the best method available.

**12.0 Communications:**
A progress report on operations prepared by the Chief Scientist may be relayed to the program office. Sometimes it is necessary for the Chief Scientist to communicate with another vessel, aircraft, or shore facility. Through various modes of communication, the ship is able to maintain contact with the Marine Operations Center on an as needed basis. These methods will be made available to the Chief Scientist upon request, in order to conduct official business. Due to a new directive from Marine Operations Center, the ship must charge the science party for all calls made on the cell or sky-cell telephone. INMARSAT, Sky Cell and cellular communication costs shall be reimbursed to the ship for telephone calls made by all scientific personnel. Currently, Sky Cell and cellular telephone services are about $0.89 per minute and INMARSAT Mini-M is around $1.68 per minute for voice. These charges will be assessed against the program after NOAA Ship NANCY FOSTER receives the bill. There is generally a three-month delay receiving the bill for review. The Chief Scientist will be required to keep a log of all calls made by the science party. The program will also provide a cell phone to be kept on the bridge.

**13.0 Disposition of Data**:
The Chief Scientist is responsible for the disposition of data.

**14.0 Reports**:
The requirement for a formal cruise report by the Chief Scientist is left to the discretion of the CCFHR Center Director. A Ship Operations Evaluation Form is to be completed by the Chief Scientist(s) and forwarded to:

Office of Marine and Aviation Operations
Program Services and Outsourcing Division
SSMC3, Room 12872
1315 East-West Highway
Silver Spring, MD 20910-3282

**15.0 <u>Cruise Instruction Approvals</u>:**

The Marine Operations Center and NOAA Ship NANCY FOSTER will acknowledge receipt of these instructions

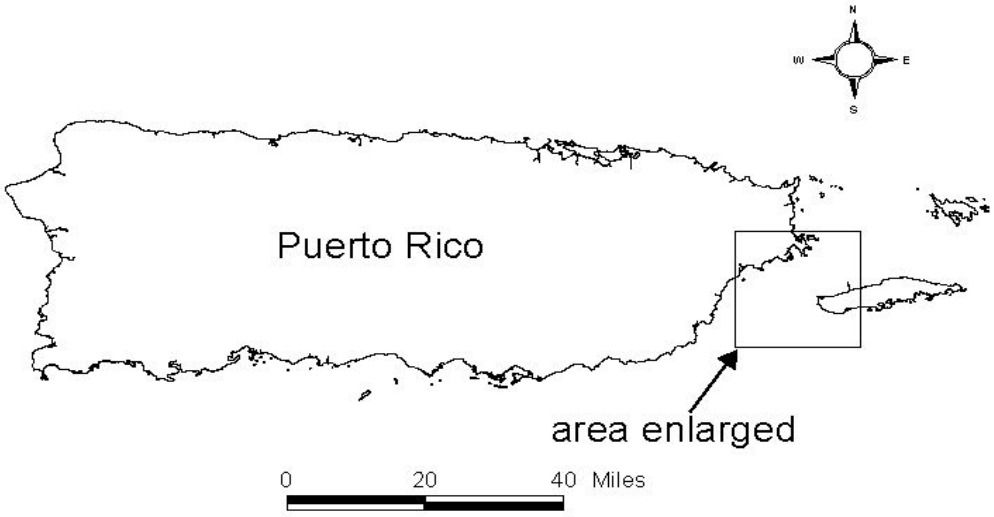

Figure 1. Map of Puerto Rico showing the general area of the study sites enlarged in southeastern Puerto Rico.

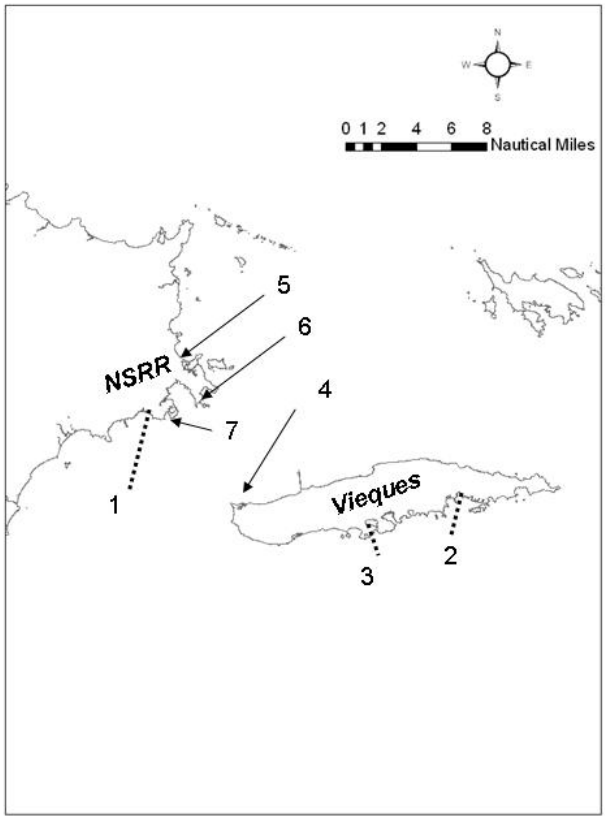


Figure 2. Map of the location of study sites at NSRR and Vieques. Dashed lines indicate general location of the three fish sampling transects; 1) Bahia Algodones, 2) Ensenada Honda on south coast of Vieques, and 3) Puerto Ferro. Also shown are the general locations of; 4) northwest coast of Vieques blowout, shallow seagrass fish sampling sites and patch reefs, 5) Seagrass disturbance site at Playa Naguabo, 6) Fish sampling site at Bahia Puerca, and 7) Seagrass disturbance site at Pelican Cove. Puerto Mosquito is the next small bay just east of Puerto Ferro.

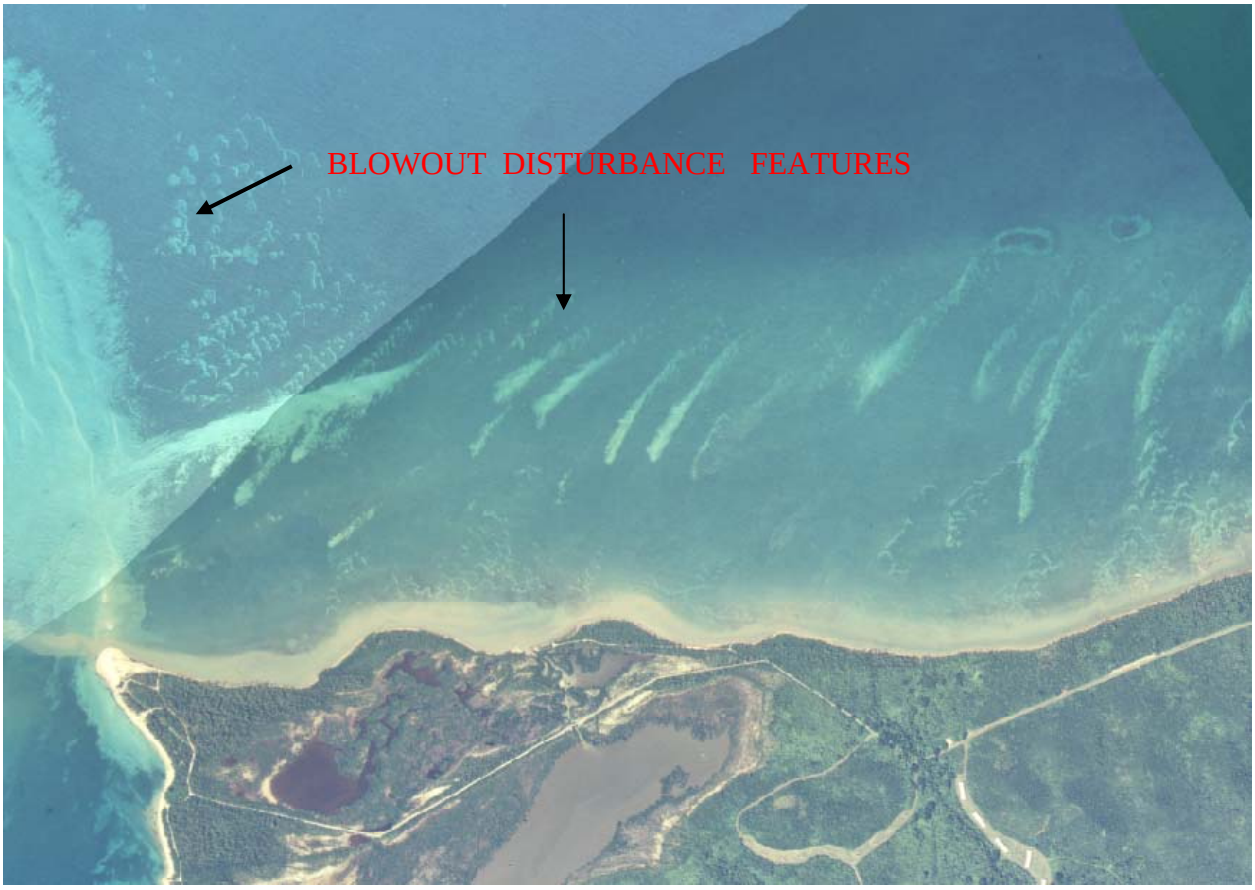


Figure 3. Aerial photograph of the northwest coast of Vieques. The shoal on the left side of the photo is Punta Arenas and the variable shaped light colored features scattered throughout the seagrass bed are the disturbances we will be sampling. Also visible in the upper right hand corner of the photo are the two patch reefs to be sampled.

**Submitted by**:

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|---|---|
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| Date_____ | Date_____ |

**Approved by**:

Captain Jon Rix
Commanding Officer, Atlantic
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Date_____